

# Radon and Lung Cancer in New Hampshire

Making The Connection  
for Risk Communication

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# Presentation Overview

- What is radon?
- What are its health effects?
- Awareness, attitudes and actions of NH citizens
- Associating radon with lung cancer for better risk communication

# What is Radon?

- Radioactive gas
- Colorless and odorless
- Exposure potential
- Enters home primarily through basements
- Easily detectable
- Class A carcinogen

# What are Radon's Health Effects?

## ■ LUNG CANCER

- ◆ It's almost that simple

# Radon and Lung Cancer

- Second leading cause of lung cancer (behind smoking)
- Nationally, an estimated 10-14% of lung cancer is related to radon exposure
  - ◆ NH is probably closer to 20%

# What do NH Citizens know about Radon?

## ■ NH BRFSS 2000

- ◆ Heard of Radon? 81% YES

- ◆ Is it unhealthy? 93% YES

- What are the health effects?

- 49% Lung Cancer

- 27% Other Cancer

- 24% Non-Cancer Illness

- Bottom line: only 1/3 of NH adults have “informed recognition” about radon

# What are NH citizens doing about Radon?

## ■ NH BRFSS 2000

### ◆ Have you tested your home for Radon?

◆ 1994 17% YES

◆ 2000 28% YES

## ■ Some progress, but still:

◆ 300,000 homes untested

◆ 100,000 homes likely high radon

# Radon and Lung Cancer: Making the Connection

- What do NH residents know about radon?
- What do they know about lung cancer?
- What do they know about radon and lung cancer?

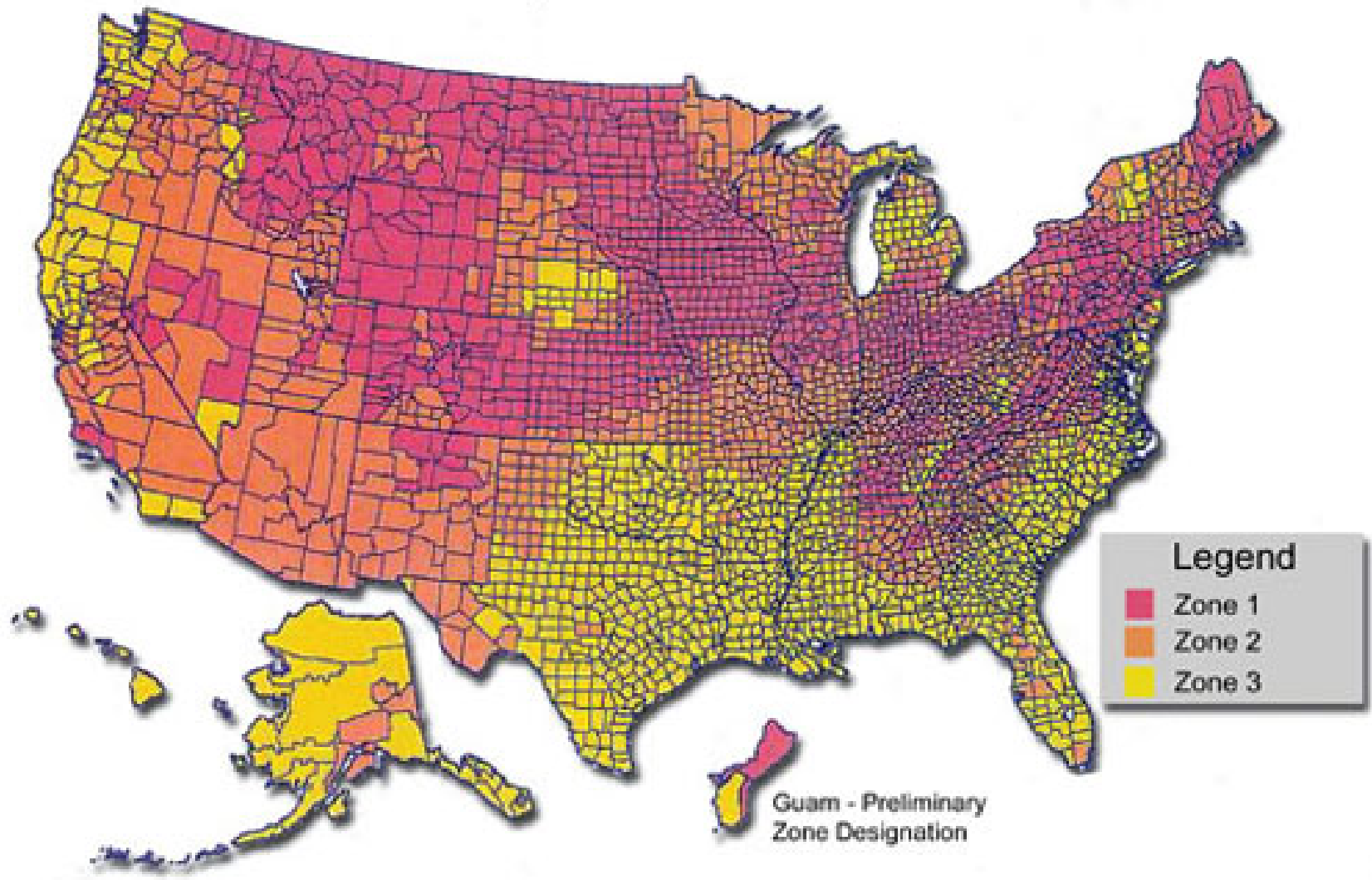
**CONCLUSION:** Increased public awareness will very likely increase testing and mitigation.



# Current Depictions of Radon Risk

- United States by county
- NH by county
- NH by town

## EPA Map of Radon Zones



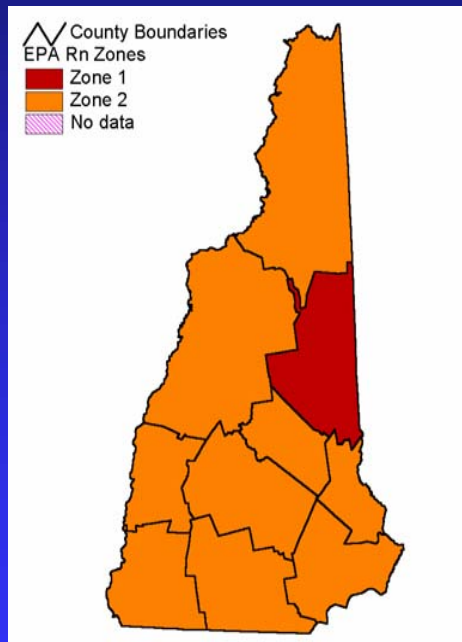
Zone 1 = >4 pico-curies

Zone 2 = 2-4 pico-curies

Zone 3 = <2 pico-curies

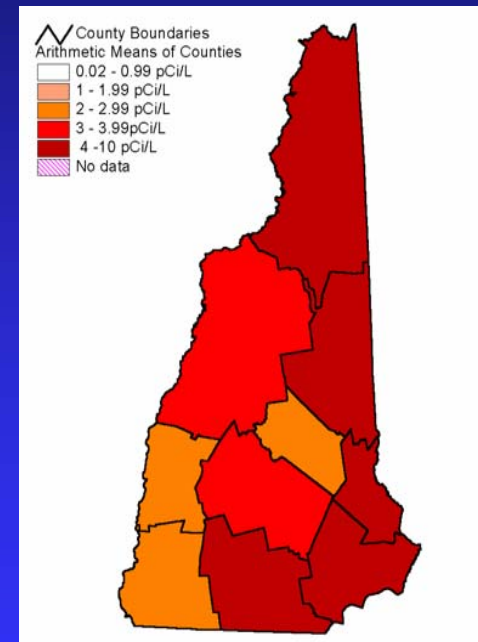
# Radon Maps for NH

EPA predicts



1987-1989

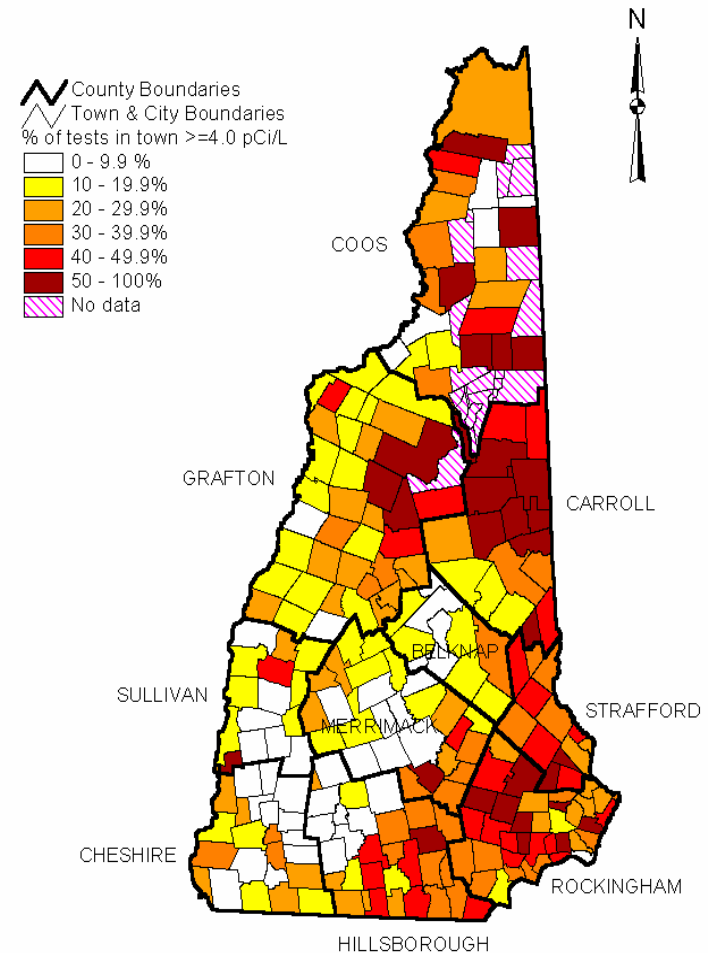
Our data suggests



1987-2002

# Radon in Granite State Towns

Results from a total of 15,000 short-term radon tests  
conducted by homeowners in lowest-livable level,  
generally during the period November - April,  
1987 - 2002



# Toward a Linkage of Radon and Lung Cancer

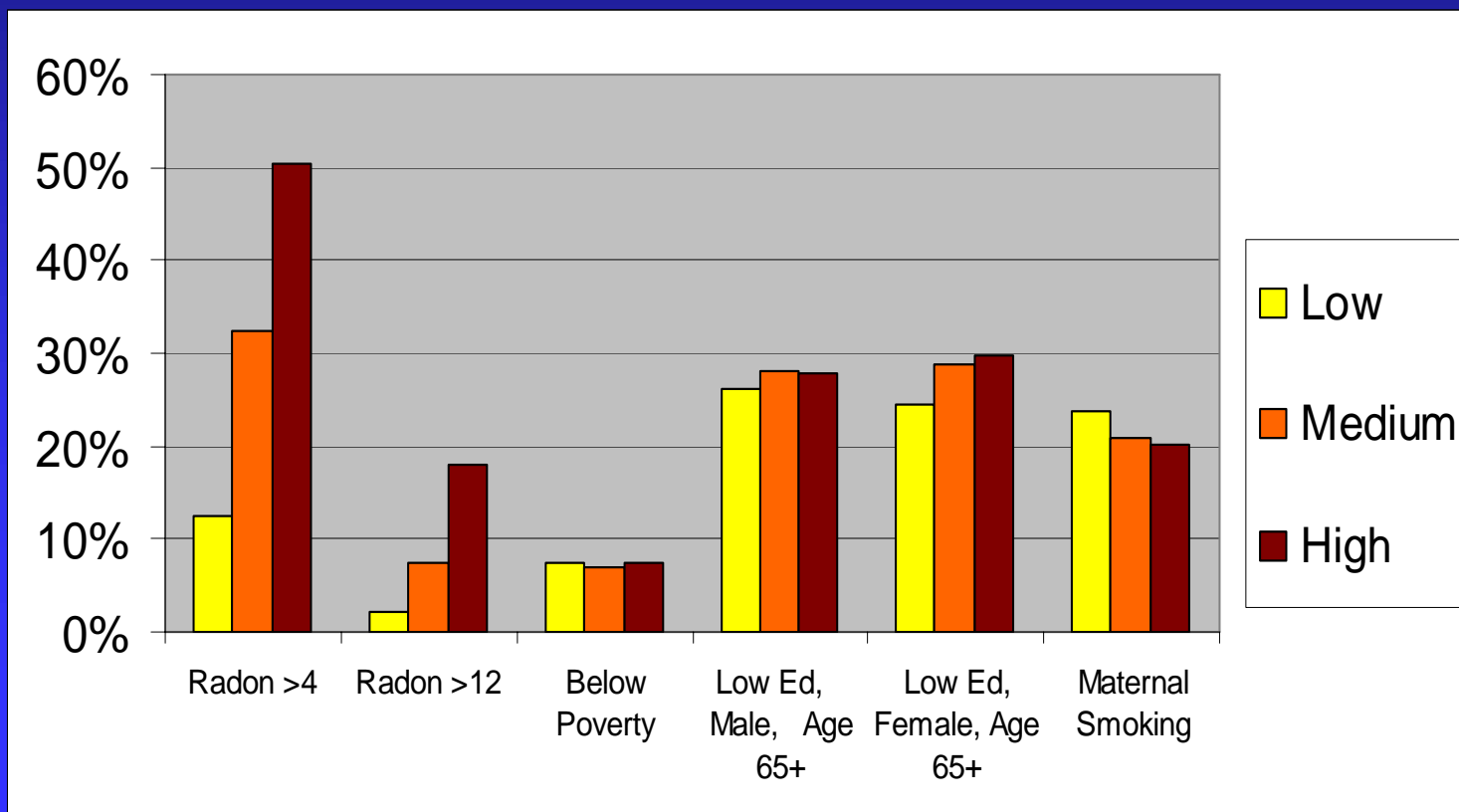
- Technically – Create a database with both radon data and lung cancer data
- Conceptually – Use linked data to increase public awareness of the radon-lung cancer association

# Data Linkage Methods

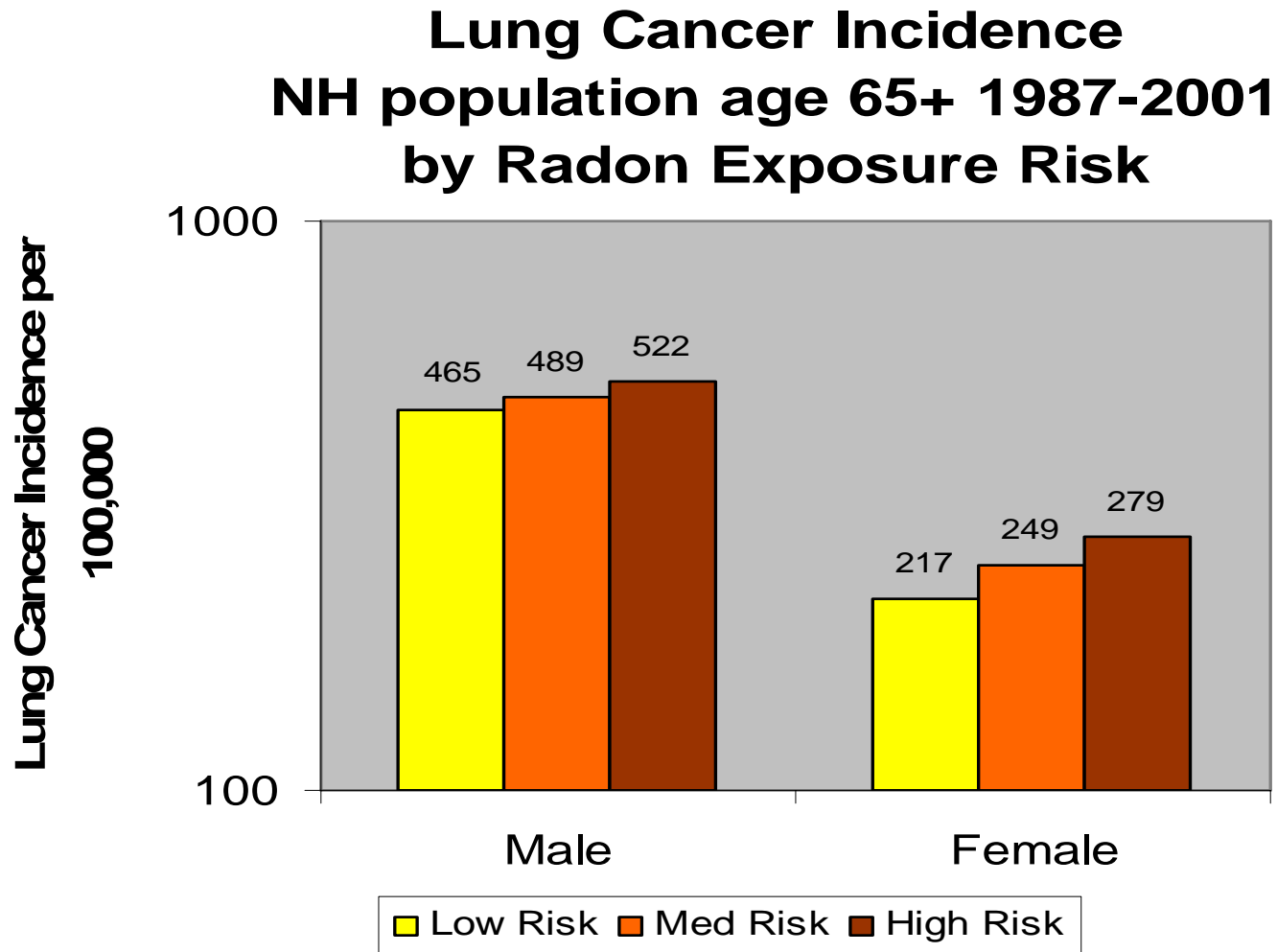
- Record level data from multiple databases:
  - ◆ NH Cancer Registry: Lung Cancer cases 1987-2001 (N=11066)
  - ◆ NH Radon Database: Test results 1987-2002 (N=15,000+)
  - ◆ US Census, NH Birth files
- Aggregated and linked at NH town level (N=259)
  - ◆ Useful statistics for radon, not for lung cancer

# Lung Cancer Risk Factors by Town Radon Risk Category

**Analysis I:** Towns divided into radon risk categories - HIGH, MIDDLE, and LOW (N=3)



# Lung Cancer Incidence by Town Radon Risk

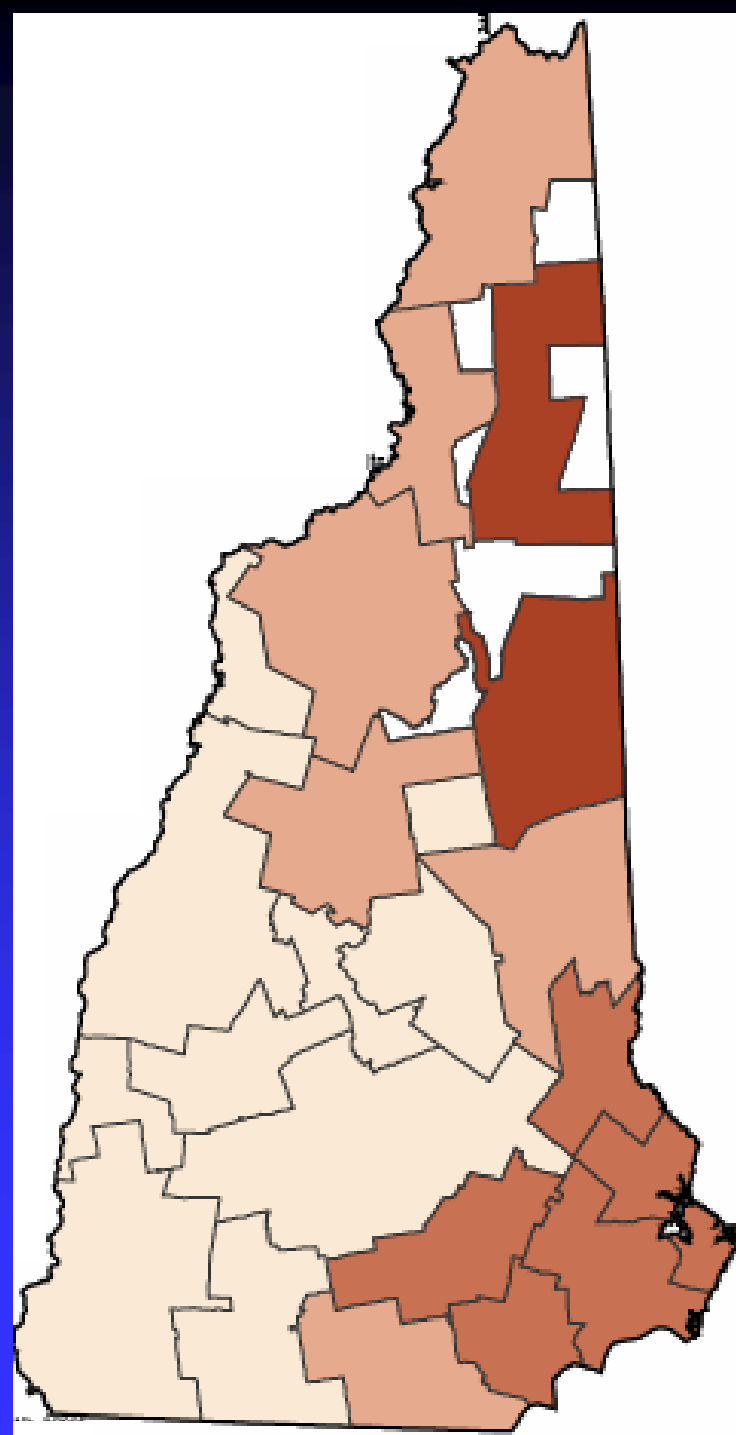
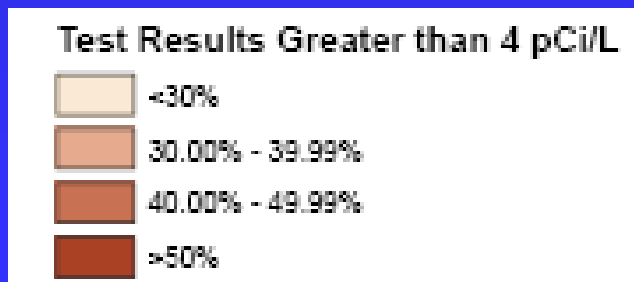




# Data Linkage and Presentation

- **Analysis II:** Towns aggregated into Hospital Service Areas (N=23)
  - ◆ HSAs more precise than counties
  - ◆ More appropriate than town-level for cancer statistics
  - ◆ Based around hub communities
  - ◆ Enables geographic presentation of data

# NH Radon Results by HSA



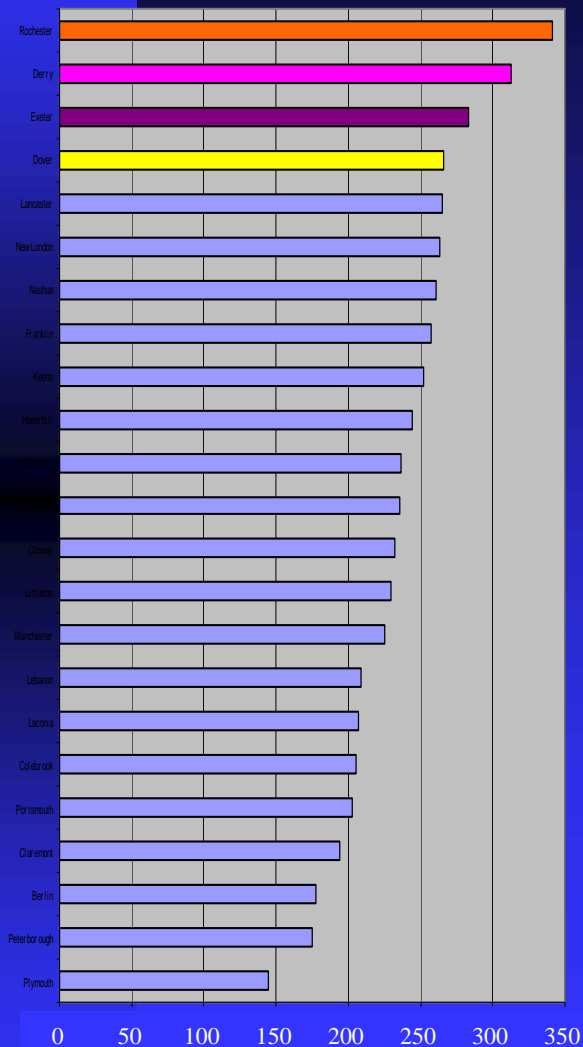
# Data Analysis and Presentation

## ■ HSA example I

- ◆ Lends possible explanation to unexpectedly high lung cancer rates in some areas
  - Maternal smoking used as proxy for the “smoking culture”
  - Lung Cancer Incidence for females age 65+ used for exposure length and comparative geographic stability
  - Radon rankings: % of tests  $>4$  picos/L

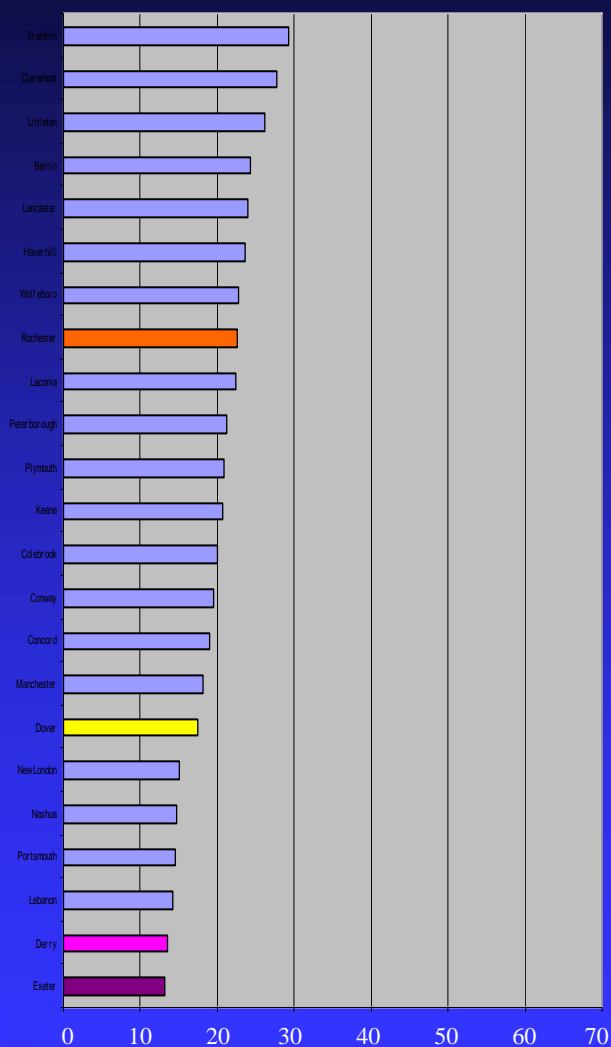
# NH Hospital Service Area Rankings

## Lung Cancer



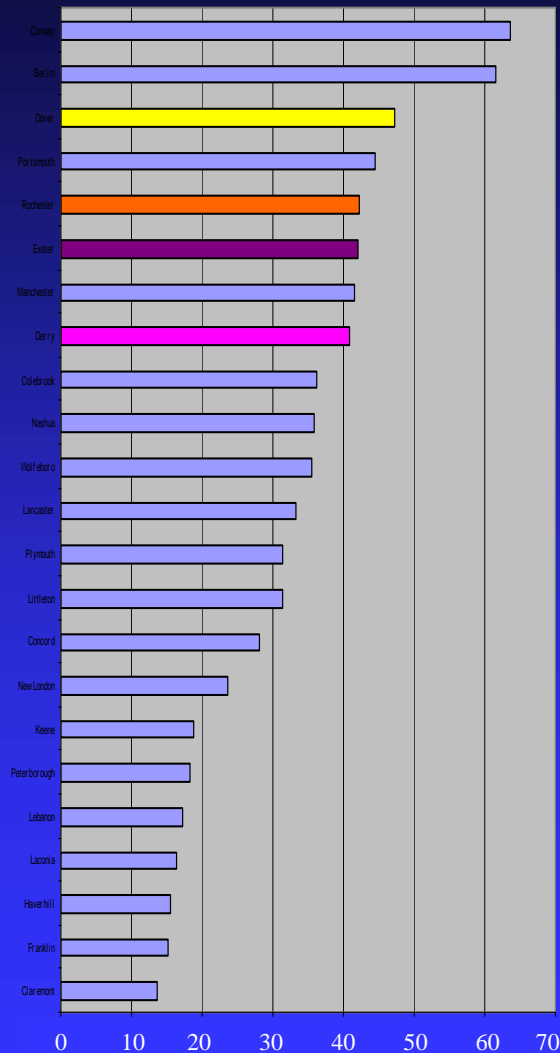
Lung Cancer Incidence per 100K -Females Age 65+,  
1987-2001

## Maternal Smoking



Smoking Prevalence (%)

## Radon



Radon tests >= 4 pCi/L (%)

HSA:



Rochester



Derry



Exeter



Dover

# Data Analysis Methods

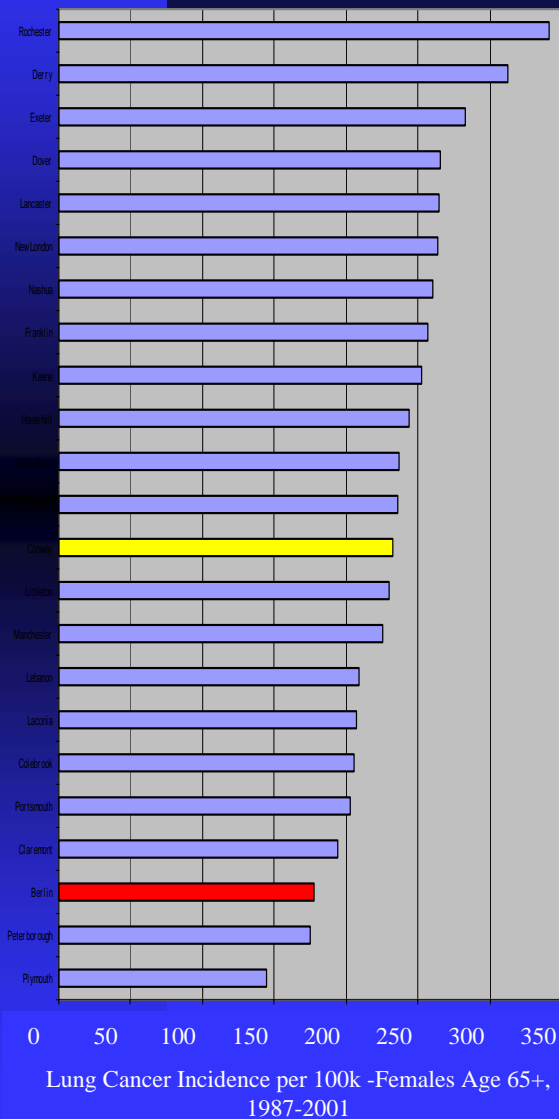
- HSA example II

- ◆ On the other hand...

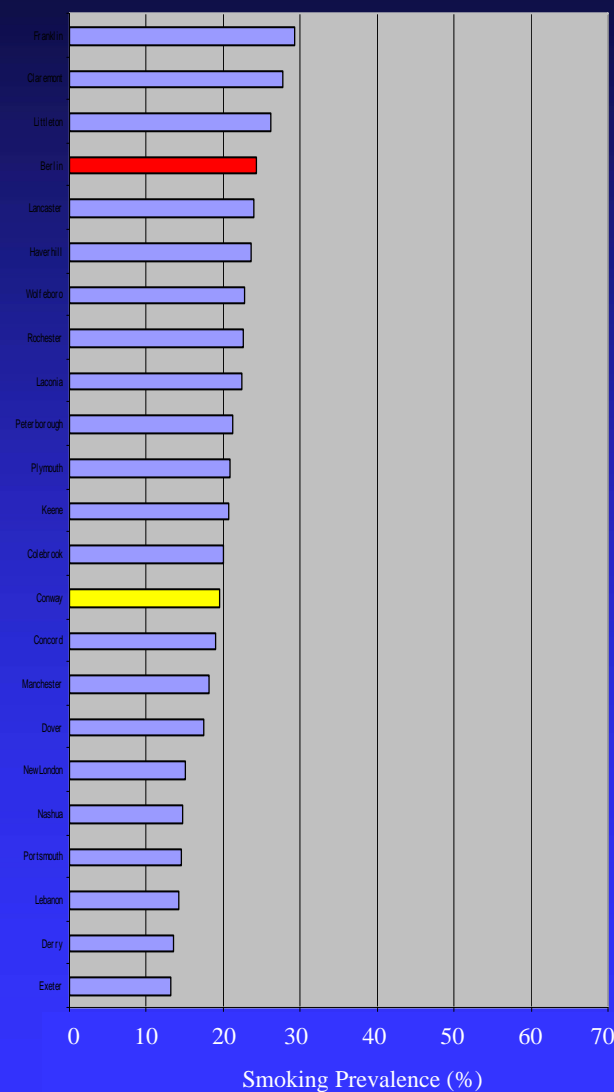
- ◆ HSAs highest in radon exposure potential do not conform to this pattern

# NH Hospital Service Area Rankings

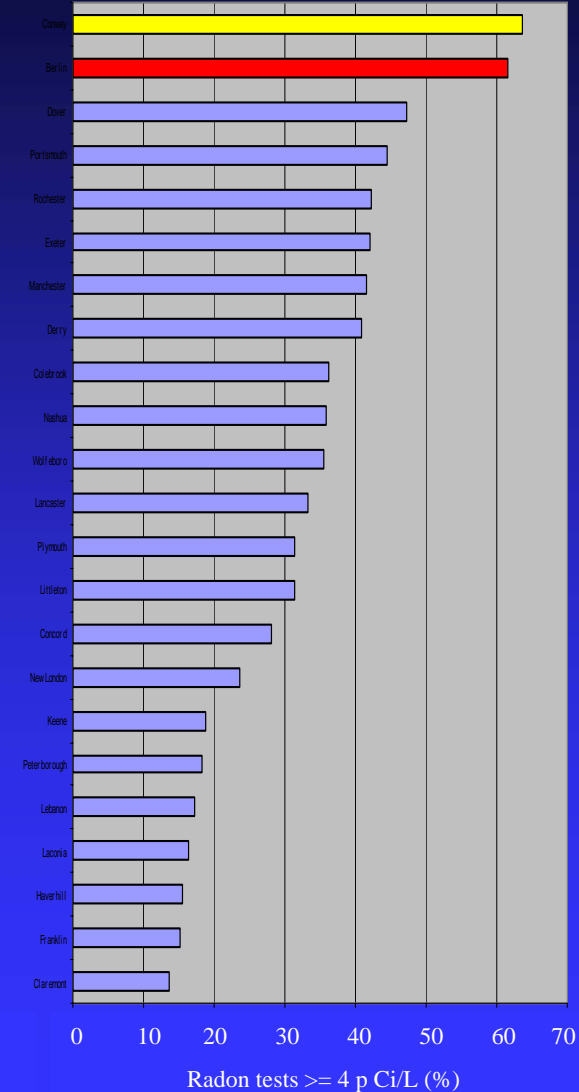
## Lung Cancer



## Maternal Smoking



## Radon



HSA:



Conway



Berlin

# Communicating the Risk: Current Radon Efforts

- Outreach to home inspectors and real estate industry
- Annual survey and free test kits target specific geographic areas with higher risk
- Phone follow up to homeowners with high radon test results

# Communicating the Risk: Future EPHT Activities

- Coordinate outreach efforts with environmental and health professionals in high risk HSAs
- Work with local American Cancer Society to carry the radon-lung cancer message
- Time EPHT outreach efforts to coincide with next fall's radon testing season